

### ABSTRACT OF THE DISCLOSURE

Provided is a manufacturing method for realizing a low cost and high performance vertical MOSFET. The vertical MOSFET manufacturing method of the present invention gives the portion formed between the trench and the semiconductor substrate flat portion a smooth shape by doping the semiconductor substrate with an impurity through ion implantation and then thermally oxidizing the substrate. The withstand voltage of the gate insulating film is thus improved. Furthermore, the semiconductor device manufacturing method of the present invention puts the formation of the N<sup>+</sup> diffusion layer serving as a source after the formation of the trench and the subsequent formation of the gate electrode in the trench, and therefore can avoid re-diffusion of the N<sup>+</sup> diffusion layer, which otherwise causes an increase in leak current.